TURCK

Industrielle Automation

User manual

BLCDN-6M12LT-2RFID-S-8XSG-PD

Sense it! Connect it! Bus it! Solve it!

BLCDN-6M12LT-2RFID-S-8XSG-PD

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1 General safety notes

1.1 Before the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit.
- Cover or enclose neighboring units that are live.
- Follow the engineering instructions of the device concerned.Only suitably qualified personnel in accordance with EN 50 110-1/-2 (VDE 0 105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalisation.
- The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference do not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- Ensure a reliable electrical isolation of the Ensure a reliable electrical isolation of the low low voltage for the 24 volt supply. Only use power supply units complying with IEC 60 364-4-41 (VDE 0 100 Part 410) or HD 384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC/EN 60 204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings.
- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
- Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).
- The electrical installation must be carried out in accordance with the relevant regulations (e. g. with regard to cable cross sections, fuses, PE).
- All work relating to transport, installation, commissioning and maintenance must only be carried out by qualified personnel. (IEC 60 364 and HD 384 and national work safety regulations).
- All shrouds and doors must be kept closed during operation.

2 General information

This manual includes all information necessary for the prescribed product. It has been specially conceived for personnel with the necessary qualifications.

ATTENTION

Please read this section carefully. Safety aspects cannot be left to chance when dealing with electrical equipment.

2.1 Description of symbols Used

WARNING

This sign can be found next to all notes that indicate a source of hazards. This can refer to danger to personnel or damage to the system (hardware and software) and to the facility.This sign means for the operator: work with extreme caution.

ATTENTION

This sign can be found next to all notes that indicate a potential hazard.This can refer to possible danger to personnel and damages to the system (hardware and software) and to the facility.

NOTE

This sign can be found next to all general notes that supply important information about one or more operating steps. These specific notes are intended to make operation easier and avoid unnecessary work due to incorrect operation.

2.2 Prescribed Use

Appropriate transport, storage, deployment and mounting as well as careful operating and thorough maintenance guarantee the trouble-free and safe operation of these devices.

WARNING

The devices described in this manual must be used only in applications prescribed in this manual or in the respective technical descriptions, and only with certified components and devices from third party manufacturers.

2.3 Notes Concerning Planning /Installation of this Product

WARNING

All respective safety measures and accident protection guidelines must be considered carefully and without exception.

3 Introduction

3.1 BL compact – High signal variety in a compact design

For the first time, BL compact provides a product family of IP67 fieldbus devices that can meet any requirement in the I/O level in terms of signal type and connectivity. Until now, compact fieldbus stations were applied to process only digital fieldbus signals. BL compact now allows a wide range of I/O tasks to be implemented outside of the control cabinet in a compact design with virtually any signal combination.

The basic concept

With the modular concept of the BL67 system by TURCK a fieldbus node can be installed outside the control cabinet using any signal combination. For this purpose, passive base and active electronic modules are connected to fieldbus gateways which fulfill application specific I/O tasks. Such a fieldbus node can take one gateway with up to 32 extension modules (max. 512 I/O points). For applications with low signal density and limited mounting space, BL compact is an efficient alternative because basically all BL67 I/O signals are also available in BL compact.

The modular principle

The BL compact devices provide three basic functions in a single housing: Fieldbus connection, I/O signal and connector. Depending on the housing style, one or two I/O modules can be housed. The smaller versions (e.g. M12S and M12MT) can link any BL67 electronic module each to PROFIBUS-DP or DeviceNet™. The bigger versions (e.g. M12LT) have space for two BL67 electronic modules, making the possibilities of signal combination nearly infinite.

NOTE

The I/O-system BL compact does not require mounting in an extra housing. It was specially designed for the harsh industrial environment and for direct mounting on the machine and in the process. The system is extremely robust and protected against dirt, dust and the most liquids through its high degree of protection. However, it is not suited for the following applications: high pressure jet cleaning, 100 % humidity, out-door installation or permanent operation in liquids.

4 Technical data

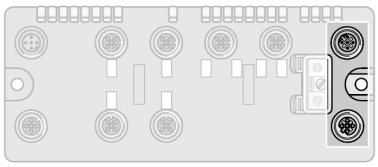
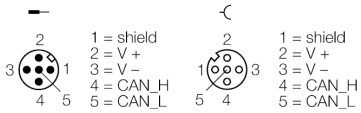
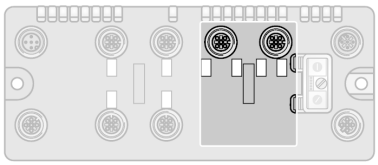
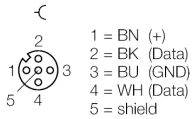
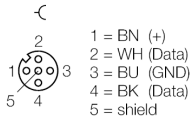
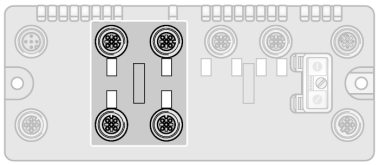
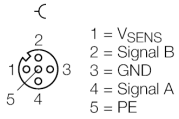
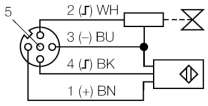
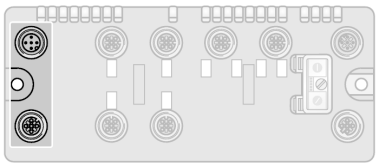
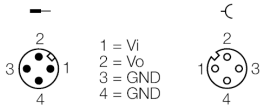
Type	BLCDN-6M12LT-2RFID-S-8XSG-PD
Ident-No.	6811049
Supply voltage	24 VDC
Admissible range	11...30 VDC
Voltage supply connection	2 x M12, 4-pin
Power loss, typical	≤ 1 W
Nominal voltage V_i	24 VDC
Nominal voltage V_o	24 VDC
Max. sensor supply I_{sens}	4 A
Max. load current I_o	4 A
Fieldbus transmission rate	125…500 kbps
Adjustment transmission rate	auto detection
Fieldbus addressing range	0...63 64…80 (Programmable MACID) 81…99 (Vendor Specific)
Fieldbus addressing	2 decimally coded rotary switches
Service interface	RS232 interface
Fieldbus connection technology	2 x M12, 5-pin
Fieldbus termination	external
Digital inputs	
Input type	pnp
Type of input diagnostics	channel diagnostics
Sensor supply	24 VDC, 100 mA short-circuit limiting
Low level signal voltage	< 4.5 VDC
High level signal voltage	7…30 VDC
Active level (IC) signal current	< 1.5 mA
Signal voltage inactive level	2.1 … 3.7 mA
Input delay	0.25 or 2.5 ms
Digital outputs	
Output type	pnp
Type of output diagnostics	channel diagnostics
Output current per channel	0.5 A
Output voltage	24 VDC
Output delay	3 ms
Load type	resistive, inductive, lamp load
Load resistance, resistive	> 48 Ω
Load resistance, inductive	< 1.2 H
Lamp load	< 3 W
Switching frequency, resistive	< 200 Hz
Inductive switching frequency	< 2 Hz
Switching frequency, lamp load	< 20 Hz
Short-circuit protection	yes
Technology	
Signal type	Simple RFID Interface
Number of channels	2
Sensor supply	0.5 A per channel, short-circuit proof
Simultaneity factor	1
Cable length	50 m
Electrical isolation	isolation of electronics and field level via opto-couplers
Number of input bytes	26
Number of output bytes	26
Operating temperature	-40...+70 °C
Storage temperature	-40...+85 °C
Extended vibartion resistance	
- up to 20 g (at 10 to 150 Hz)	firm mounting on base plate or machine
Protection class	IP69K

4 Technical data

Operating temperature	-40...+70 °C
housing material	Glass-filled nylon, nickel plated brass connectors

5 Fieldbus and I/O connections

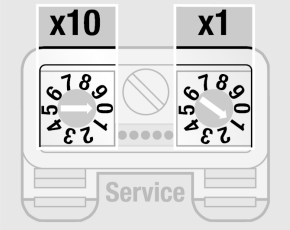
5.1 Pinning and wiring diagram

	**Fieldbus accessories** DeviceNet™ fieldbus cable (example): RSC-RKC572-2M Ident no. 6603629	**Pin configuration** 
	**Slot 1: RFID** Matching connection cable (for example): RK4.5T-5-RS4.5T/S2500 Ident no. 6699201	**Connectors …/S2500**  **Connector …/S2501** 
	**Slot 2: digital XSG channels**	**Pin configuration**  **Wiring diagram** 
	**Voltage supply**	**Pin configuration** 

6 Commissioning

6.1 Address setting

The DeviceNet™ address setting at the module is done via the two decimal rotary coding switches under the protective cover. DeviceNet™ allows a maximum of 64 (00 to 63) addresses (MAC IDs) to be assigned. Each address may be allocated only once in the entire bus structure.



All new settings become valid only after a module restart!

6.2 Setting the transmission rate

The module provides automatic transmission rate detection.
The bit rate can be changed via the standard ODVA DeviceNet Class™ (Class 0x03, Instance 0x01, Attribute 0xx02).

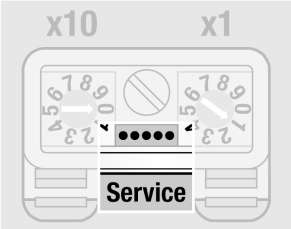
6.3 Field bus termination

If the module is used as the first or the last station in the bus communication, the fieldbus line has to be terminated using a terminating resistor.
The module offers no internal bus terminating resistor. The termination has to be done externally.

Terminating resistor (female), RKE57-TR2, Ident-no.: 6602629
Terminating resistor (male), RSE57-TR2, Ident-no.: 6602308

6.4 Service interface

In order to connect the service interface on the module with a PC and the I/O-ASSISTANT software (project planning and diagnostics software), a cable with a pin assignment, different from the PS2 standard pin assignment, has to be used.



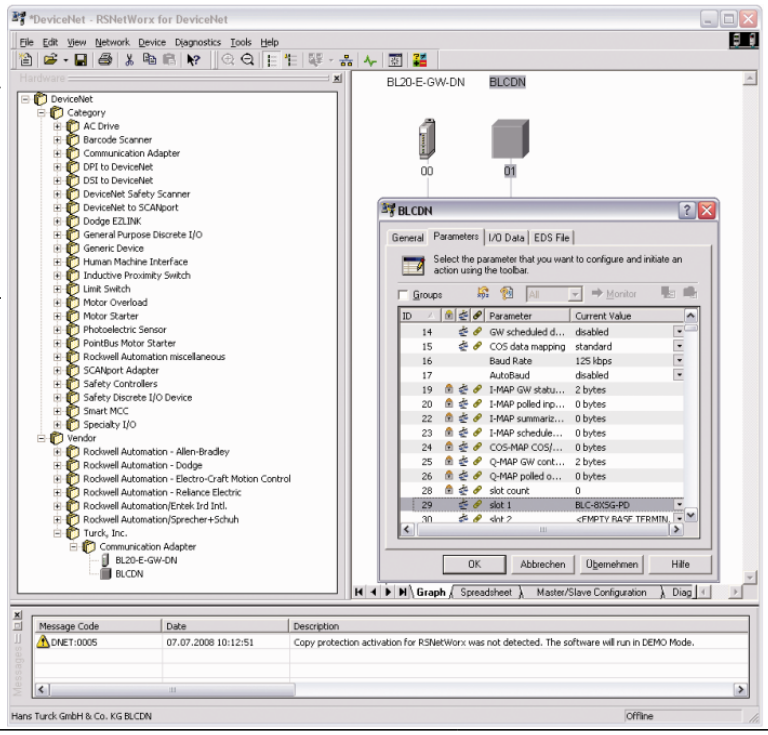
6 Commissioning

6.5 PLC configuration

The modules can be integrated into the DeviceNet™ structure by means of module specific BL compact EDS files.

Commissioning in a configuration tool

Registrate the EDS-files in the PLC configuration tool eg. in RSNetWorX from Rockwell Automation. The BL compact modules can now be found under “TURCK, Inc.> Communication Adapter“. Add the modules to your fieldbus line. The EDS-files can be downloaded from **www.turck.com.**


*DeviceNet - RSNetWorx for DeviceNet
File Edit View Network Device Diagnostics Tools Help
BL20-E-GW-DN
BLCDN
00
01
BLCDN
General Parameters I/O Data EDS File
Select the parameter that you want to configure and initiate an action using the toolbar.
Groups
ID Parameter Current Value
14 GW scheduled d... disabled
15 COS data mapping standard
16 Baud Rate 125 kbps
17 AutoBaud disabled
19 I-MAP GW statu... 2 bytes
20 I-MAP polled inp... 0 bytes
22 I-MAP summariz... 0 bytes
23 I-MAP schedule... 0 bytes
24 COS-MAP COS/... 0 bytes
25 Q-MAP GW cont... 2 bytes
26 Q-MAP polled o... 0 bytes
28 slot count 0
29 slot 1 BLC-8XSG-PD
30 slot 2 <EMPTY BASE TERMIN
OK Abbrechen Übernehmen Hilfe
Graph Spreadsheet Master/Slave Configuration Diag
Message Code Date Description
DNET:0005 07.07.2008 10:12:51 Copy protection activation for RSNetWorx was not detected. The software will run in DEMO Mode.
Hans Turck GmbH & Co. KG BLCDN
Offline

6.6 Vendor Specifc Classes (VSCs)

BL compact modules for DeviceNet™ are based on the communications adapter profile according to ODVA specifications Rel. V2.0 (ODVA: Open DeviceNet™ Vendor Association).

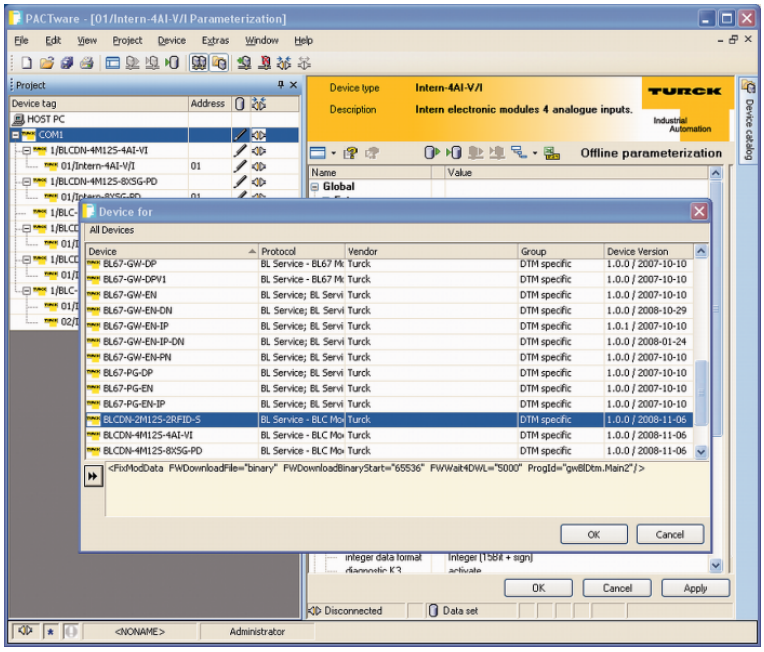
Besides the standard DeviceNet™ classes, this module supports the following Vendor Specific Classes (VSC):
100 (64h) Gateway Class
101 (65h) Terminal Slot Class
102 (66h) Process Data Class
+ VSCs for the respective I/O channels.

NOTE

For more detailed information about the PLC-configuration of TURCK DeviceNet™-products or the Vendor Specific Classes of the I/O-channels, please read for example the respective BL67 manual D300528.pdf which can be downloaded from www.turck.com.

7 The I/O-ASSISTANT

The configuration software I/O-ASSISTANT supports you in planning and implementation of an I/O system.
No matter if you are online or offline, the software simplifies the configuration and parameterizsation of the modules. The I/O-ASSISTANT is also extremely helpful in system set-up and testing.



7.1 FDT/DTM

The system configuration, parameterization and diagnostics are done via graphical interfaces based on FDT/DTM technology.
The DTMs can be integrated in any FDT frame application for configuration, commissioning and maintenance.
The I/O-ASSISTANT and the DTMs are available free of charge on www.turck.com.

Software functions

- Supporting software tool
- Configuration, parameterization and commissioning of BL Compact modules via DTM-technology
- Import of BL Compact DTM-files
- Offline planning and configuration of BL67, BL20 and BL compact I/O modules
- Reading and setting of process data
- Commissioning help for testing the wiring and sensors without PLC
- Automatic documentation of configured TURCK-systems

8 LED description

8.1 Stations LED Status

LED	Colour	Status	Description
IOs		OFF	No power
	RED	ON	Low power or station error
	RED	FLASHING (1 Hz)	I/O module configuration error
	RED	FLASHING (4 Hz)	No I/O module bus communication
	GREEN	ON	Station ok
	GREEN	FLASHING	Force mode active
MNS		OFF	No connection
	GREEN	ON	Connection established
	GREEN	FLASHING (1 Hz)	No connection established, device OK
	RED	ON	Duplicate MAC-ID
	RED	FLASHING	Connection time out
IO	GREEN	ON	I/O active
	GREEN	FLASHING (1 Hz)	One or more I/O idle
	RED	ON	One or more I/O error
	RED	FLASHING	One or more I/O faulted

8.2 I/O LED Status Slot 1

LED	Colour	Status	Description
D1 *		OFF	No diagnostics active
	RED	ON	Station error/ module bus communication failure
	RED	FLASHING (0.5Hz)	Any diagnostics active
RW0 / RW1		OFF	No tag present, no diagnostics active
	GREEN	ON	Tag present
	GREEN	FLASHING (2 Hz)	Data communication from / to tag active
	RED	ON	Error in the R/W head
	RED	FLASHING (2 Hz)	Short circuit in the transceiver supply

* D1 LED also reports gateway diagnostics

8.3 I/O LED Status Slot 2

LED	Colour	Status	Description
D2 *		OFF	No diagnostics active
	RED	ON	Station error/ module bus communication failure
	RED	FLASHING (0.5Hz)	Any diagnostics active
XSG channels 0...7		OFF	Channel status x = “0“ (OFF), no diagnostics active
	GREEN	ON	Channel status x = “1“ (ON)
	RED	ON	Short-circuit at output
	RED	FLASHING (2 Hz)	Short-circuit sensor supply

* D2 LED also reports gateway diagnostics

9 Mapping and diagnostics

9.1 I/O and Diagnostic Data mapping

INPUT	BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RFID channel 0	0	DONE	BUSY	ERROR	XCVR CON	XCVR ON	TP	TFR	Reserved
	1	Error Code							
	2	Error Code 1							
	3	Reserved							
	4	READ DATA (8 Byte)							
	5								
	...								
	10								
	11								
RFID channel 1	12	DONE	BUSY	ERROR	XCVR CON	XCVR ON	TP	TFR	Reserved
	13	Error Code							
	14	Error Code 1							
	15	Reserved							
	16	READ DATA (8 Byte)							
	17								
	...								
	22								
	23								
XSG	24	$I\,2_7$	$I\,2_6$	$I\,2_5$	$I\,2_4$	$I\,2_3$	$I\,2_2$	$I\,2_1$	$I\,2_0$
	25	-	-	-	-	-	-	-	-

Diag.	26	Module number reporting diagnostic data							
	27	Replace station	N/A	Diag. active	Reserved				
In case of slot 1* (ref. byte 26) RFID diag.	28	Reserved					XCVR_ PS OFF CH 0	Reserved	
	29	Reserved				XCVR_ PS ERROR CH 0	Reserved		XCVR HD-WR ERROR CH 0
	30	Reserved					XCVR_ PS OFF CH 1	Reserved	
	31	Reserved				XCVR_ PS ERROR CH 1	Reserved		XCVR HD-WR ERROR CH 1
In case of slot 2* (ref. byte 26) XSG diag.	28	Reserved				Over current I 3 / I 7	Over current I 2 / I 6	Over current I 1 / I 5	Over current I 0 / I 4
	29	Over current O 7	Over current O 6	Over current O 5	Over current O 4	Over current O 3	Over current O 2	Over current O 1	Over current O 0
	30	Reserved							
	31	Reserved							

OUTPUT	BYTE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

9 Mapping and diagnostics

RFID channel 0	0	XCVR	NEXT	TAG ID	READ	WRITE	TAG INFO	XCVR INFO	RESET
	1	Reserved					Byte Count 2	Byte Count 1	Byte Count 0
	2	Address high byte							
	3	Address low byte							
	4	WRITE DATA (8 Byte)							
	5								
	...								
	10								
	11								
RFID channel 1	12	XCVR	NEXT	TAG ID	READ	WRITE	TAG INFO	XCVR INFO	RESET
	13	Reserved					Byte Count 2	Byte Count 1	Byte Count 0
	14	Address high byte							
	15	Address low byte							
	16	WRITE DATA (8 Byte)							
	17								
	...								
	22								
	23								
XSG	24	$O\ 2_7$	$O\ 2_6$	$O\ 2_5$	$O\ 2_4$	$O\ 2_3$	$O\ 2_2$	$O\ 2_1$	$O\ 2_0$
	25	-	-	-	-	-	-	-	-

* The scheduled diagnostic information changes every 125 ms between slot 1 and 2, if both slots send active diagnostics.

9.2 RFID-S - Diagnostic messages

The RFID-S provides status information within the process data 3 bytes per channel).

Diagnostic message	Meaning
DONE	1 = The system is not processing any commands and is ready to receive the next command. 0 = The system will ignore all incoming commands if DONE is false, except the RESET command.
BUSY	1 = The system is currently executing a command 0 = The execution of the command has finished.
ERROR	1 = An error occurred while executing a command. 0 = Errorfree execution of the demand.
XCVR_CON	1 = The transceiver is connected correctly to the RFID module. 0 = The transceiver is not connected correctly to the RFID module.
XCVR_ON	1 = The transmission between tag and tranceiver with 13.56 MHz is active. 0 = The transmission between tag and tranceiver with 13.56 MHz is not active.
TP (TAG_PRESENT)	1 = Tag detected in the transceiver air interface and it is recognized by the transceiver. 0 = No tag detected in the transceiver air interface or tag is not recognized by the transceiver.
TFR (TAG_FULLY_READ)	1 = All memory areas on the tag have been successfully read. 0 = All memory areas on the tag have not yet been successfully read.
ERROR CODES	Please read the detailed error code descriptions in the special DeviceNet™ documentation for the RFID-system.

Additionally, the module sends 4 byte (2 byte for each channel) of diagnostic data which describe the status of the connected read write head:

Diagnostic message	Meaning
XCVR_PS OFF	Transceiver power supply turned off (overload)
XCVR HDWR ERROR	Transceiver hardware error
XCVR PS ERROR	Transceiver power supply error

9 Mapping and diagnostics

9.3 8XSG - Diagnostic messages

Diagnostic message	Meaning
Over current Ix/Ix	Short circuit or overcurrent at sensor supply A, B, C or D
Over current O x	Short circuit or overload at output x. The channel is switched-off automatically. Whether it is switched on again automatically or not depends on the parameter settings for the channel (see parameters).

10 Parameters

10.1 DeviceNet™-Parameters

Gateway parameters (fieldbus communication)

The module provides the following parameters to configure the DeviceNet™-communication.
The parameters are described in module-specific EDS-files which allow text-based parameterization in EDS-interpreting configuration tools like RSNetworx from Rockwell Automation, for example.
For a parameterization via Class Instance Attribute (C - I - A), please find the necessary information in brackets (hexadecimal format).

Parameter	Description
MAC-ID (03 - 01 - 01)	0 to 63
Baud rate (03 - 01 - 02)	0 = 125 kbps * 1 = 250 kbps 2 = 500 kbps
AutoBaud (03 - 01 - 64)	0 = disable 1 = enable *
on I/O cntcn timeout (64 - 02 - 73)	Defines the output behavior in case of I/O connection timeout: 0 = switch outputs faulted * 1 = switch outputs off 2 = hold outputs
BUS OFF irtp (03 - 01 - 03)	0 = holf CAN chip in BUS OFF state * 1 = reset CAN chip

* default setting

10.2 RFID-S - Parameters

Parameter	Description
RFID-S Bypass Ch1 (in ms) (7C - 1 - 73) and RFID-S Bypass Ch2 (in ms) (7C - 1 - 43)	Bypass time of the transceiver in steps of 4 milliseconds: Values from 0 = 0 ms* to 255 = 1020 ms Please maintain the default setting “= 0“ of this parameter if the system startup is done without the error message "Dwell time of the Tag in the detection area was not long enough for successful command processing.". Check if the application makes it possible to set the recommended minimum distances, to reduce the speed or the transferred data amount. The information about the recommended and the maximum distances can be found in the Installation manual **D101583.pdf** for the RFID-system in the chapter "operating data“. If you are not able to respect the required distances or if the error is still sent due to external influences even if these distances are respected, this parameter has to be set to an adequate value.

* default setting

10.3 8XSG - Parameters

Parameter	Description
8XSG-PD invert input (75 - 1 - 7F)	The input signal is inverted (bit 0 = channel 0 to bit 7 = channel 7). 0 = normal * 1 = inverted
8XSG-PD output auto recovery (75 - 1 - 85)	The outputs (bit 0 = channel 0 to bit 7 = channel 7) switch on automatically after an overload. 0 = active * 1 = inactive
8XSG-PD output re-triggered recovery (75 - 1 - 89)	The outputs (bit 0 = channel 0 to bit 7 = channel 7) have to be retriggered in case of an overload. 0 = inactive * 1 = active
8XSG-PD enable output (75 - 1 - 8B)	Activates the output at this channel (bit 0 = channel 0 to bit 7 = channel 7). 0 = inactive * 1 = active
8XSG-PD enable 2.5ms input filtering (75 - 1 - 8F)	Sets the input filter from 0.25 ms to 2.5 ms (bit 0 = channel 0 to bit 7 = channel 7). 0 = disabled * 1 = enabled

* default setting